

Spacecraft Potable Water Monitor, Phase I

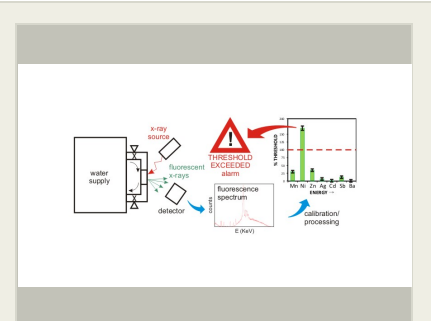
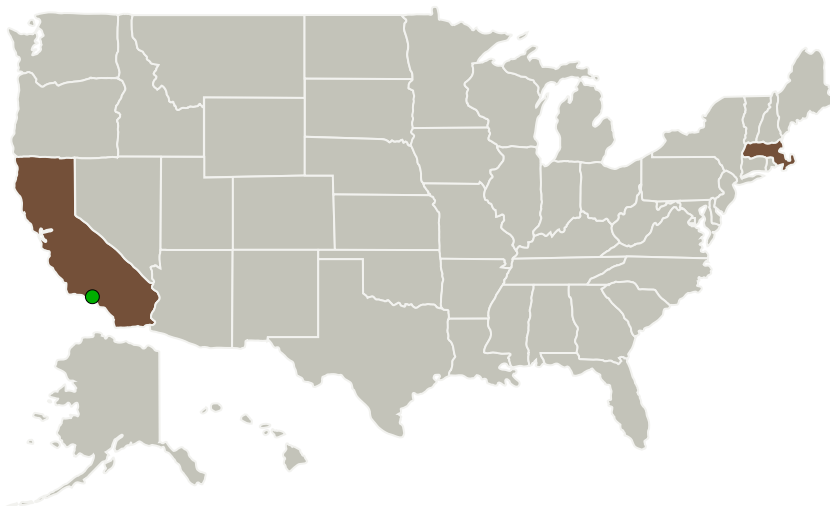
Completed Technology Project (2015 - 2015)



Project Introduction

Securing a supply of potable water is essential for human survival, and doing so aboard the ISS presents challenges distinct from terrestrial water safety challenges. Repeated recycling is the primary means of replenishing water aboard the ISS in order to minimize the need for costly re-supply of water. There is a critical need to continually monitor impurities in the water supply aboard the ISS in a manner that minimizes the sample volume. Existing technology can measure inorganic contaminants at concentrations established as safe in the Spacecraft Water Exposure Guidelines, but these methods are inappropriate for the ISS due to the required size and power of the equipment, the size of water sample required for testing, or some combination of these. Spectral Sciences, Inc. proposes to develop a novel water quality monitoring technology using x-ray fluorescence (XRF). In the proposed method, a small volume of water is diverted into a sampling chamber for XRF analysis, which takes place over a period of several minutes. XRF from the sample is detected by an energy-dispersive detector. The concentrations of contaminant elements in the sample are determined simultaneously from the fluorescence spectrum and compared to pre-determined threshold concentrations. After analysis, the water sample is returned to the main plumbing, and a warning is issued if any contaminant is present above the threshold concentration. This process would be entirely automated and require no crew interaction. The instrument would use commercially available parts common in portable XRF analyzers.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Spacecraft Potable Water Monitor, Phase I

Completed Technology Project (2015 - 2015)



Organizations Performing Work	Role	Type	Location
Spectral Sciences, Inc.	Lead Organization	Industry	Burlington, Massachusetts
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

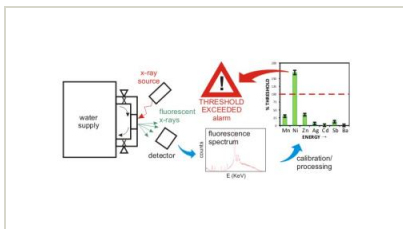
Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

**June 2015:** Project Start**December 2015:** Closed out**Closeout Summary:** Spacecraft Potable Water Monitor, Phase I Project Image**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/139486>)

Images

**Briefing Chart Image**

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(<https://techport.nasa.gov/image/134160>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Spectral Sciences, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

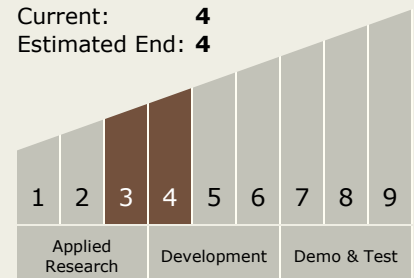
Program Manager:

Carlos Torrez

Principal Investigator:

Bridget Tannian

Technology Maturity (TRL)

Start: **3**Current: **4**Estimated End: **4**

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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.4 Environmental Monitoring, Safety, and Emergency Response
 - └ TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System